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GENERATOR

25X1

February 17, 1958

Dear Sir:

This letter report describes the activity under Task Order No. C from January 11 through January 31, 1958.

During this period, four runs were made in the small experimental generator. The results are indicated in Table 1, along with the data for the previously described Run No. 1.

On the basis of the results from these five runs, no particular problems in operating a full-scale unit are anticipated. Experience with the 1/5-scale unit, however, has suggested useful modifications in the design of the full-scale unit. These modifications include (1) the replacement of all zippers with flexible tubes which can be closed off tightly, and (2) the replacement of the spray ring with a group of direct-entry tubes for adding $CoCl_2$ to the system.

The experience gained from the 1/5-scale unit thus far has indicated that some minimum degree of uniformity of distribution of the catalyst solution must be achieved in order to complete the hydrogen-generation reaction within the prescribed 60-minute period. However, it is believed that the 20 holes in the presently used ring represent more than enough ports of entry for the catalyst solution. In view of the operating difficulties encountered

TABLE 1. DATA FOR FIRST FIVE RUNS IN 1/5-SCALE GENERATOR UNIT

Run No.	Scale	H_2, cu ft			Per Cent Reaction	Temp, F		Catalyst $CoCl_2 \cdot 6H_2O$, lb	Time for Total Generation, min	Method of Addition
		Theoretical	Uncorrected	Corrected		Initial	Rise			
1	1/10	350	287	258(1)	74(1)	53	52(1)	0.91	65	Ring
2	1/10	350	473	-(2)	-(2)	62	-(2)	0.70	70	Ring
3	1/5	718	855	686	95.5	62	63	1.37	85	Ring
4	1/10	350	245(3)	198(3)	-(3)	61	53	0.96	58	Center
5	1/5	628	698	599	95.5	54	46	1.61	150	Edge

(1) Calculated on the basis of an average temperature rise.

(2) No temperature data available because thermocouples were faulty.

(3) Considerable hydrogen lost through leak in zipper of generator.

Note: On the basis of 95 per cent purity of the borohydride, 10 lb of $NaBH_4$ will produce 350 cu ft of H_2.

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with the 20-hole ring in the process of operating the 1/5-scale unit, and in view of the data provided by Runs Nos. 4 and 5, a set of five direct-entry tubes for the addition of the $CoCl_2$ is being considered in connection with the full-scale experimental generator.

Several additional tests will be made in the 1/5-scale unit during February, to check the reliability of this system. In these tests, the $CoCl_2$ will be added from one tube in the center of the unit. The concentration of $NaBH_4$ will be varied to simulate field errors in filling the generator with the proper amount of water. The amount of $NaBH_4$ will be held constant at 20 pounds. Consideration will also be given to increasing the amount of catalyst used.

The total appropriation on this Task Order was $39,375. As of February 1, 1958, the unexpended balance was approximately $10,400.

Sincerely,

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In Duplicate

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